# Impact of Business Intelligence System Capabilities for Sustainable Business Performance in the IT Industry

## Research Protocol

For Registration in Ph. D. Programme

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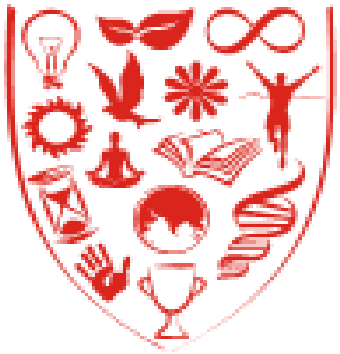

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# DECLARATION

I hereby declare that this research protocol entitled **“ Impact of Business Intelligence System Capabilities for Sustainable Business Performance in the IT Industry**” By Tarun Sharma (Reg. No. 23PHMN0007) being submitted in fulfillment of the requirements for registration in the degree of Doctor of Philosophy, Management under the Jaipur School of Business, JECRC University during the year 2023 is a bonafide record of my original work carried out under the guidance ofDr. Princi Gupta, Assistant Professor – I, Jaipur School of Business and has not been presented anywhere.

Tarun Sharma

(Research Scholar)

# CERTIFICATE

This is to certify that this Research Protocol entitled "**Impact of Business Intelligence System Capabilities for Sustainable Business Performance in the IT Industry**" submitted by Tarun Sharma (Reg. No. 23PHMN0007), in fulfillment of the requirement for registration in the Ph.D. Program in the Jaipur School of Business, JECRC University during the academic year 2023, is a bonafide record work carried out under our guidance and supervision.

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## Introduction of Business Intelligence

Business intelligence, or business excellence, is a technology-driven process that analyzes data and provides actionable information on massive amounts of stored data. It assists managers, executives, and operational staff in making well-informed business decisions.

To help executives, managers, and employees make wise business decisions, business intelligence (BI) is a technology-driven process that analyzes data and produces useful information. Organizations gather data from external and internal IT systems, prepare it for analysis, run queries against the data, and produce data visualizations, BI dashboards, and reports as part of the business intelligence (BI) process. Business users can then use the analytics results for planned operations and strategic decision-making.

Better business decisions that help companies boost revenue and enhance operational efficiency are the ultimate goal of BI projects. BI uses a variety of approaches for organizing and analyzing data together with analytics, data management, and reporting technologies to accomplish that aim.

## Information gathering and application process for business intelligence

Business intelligence architecture is more than just BI software. The typical sites for business intelligence data storage, frequently with connections to an enterprise data warehouse, are larger data marts holding subsets of business data for certain departments and business units or larger data warehouses created for the entire firm. Additionally, data lakes built on Hadoop clusters or other big data platforms are being used more and more as landing pads or repositories for data related to business intelligence and analytics, particularly text, log files, sensor data, and other unstructured or semi-structured data types.

Business intelligence (BI) solutions can gather data as it is generated from source systems in real-time as well as historical data, supporting both tactical and strategic decision-making processes. Business users are evaluating accurate and consistent data, and BI teams are usually required to use data integration and data quality management solutions to integrate, consolidate, and clean raw data from several source systems before using it in BI applications.

Information technology is generating huge amounts of business data and the data volume is expected to double or triple in the next few years. The stored and collected data need to be processed, analyzed, and to be made available for managerial efficiency and quality decision-making. Business intelligence (BI) and excellence tools enable firms to swiftly provide insights that allow them to make quality decisions, improve operational efficiency, spot new possibilities, and stand out in a crowded market.

Business organizations are forced to improve speed, quality, performance, and cost-effectiveness due to the intense competition in this ever-challenging and rapidly changing environment. These factors raise the need for decision support systems and business intelligence since they force top management to make decisions quickly and with high quality. Business intelligence also helps top management convert data into information that is useful and actionable. When it comes to complex software development and analytics, where enormous amounts of data are involved, timely and trustworthy business intelligence is extremely beneficial to an organization's flexibility and agility. BI can be a fantastic tool for turning difficult data into useful business insights when dealing with large and complex amounts of data. Since BI is still a promising technology, expanding companies view it as a key priority for enhancing their BI capabilities.

## Basic Concept of Business Intelligence

- Real-Time Analysis
- Improve Decision Making
- Easily Access and Share
- Reduce Bottleneck Risk
- Know Your Business

## Benefits of Business Tools

- Clarity of Data
- Improved Customer Experience
- Better Employee Satisfaction
- Increased Ability
- Accurate Report
- Streamlined Process

## Business Intelligence Capabilities

- **Visualization Capability**

Business intelligence's primary goal is to gather, organize, classify, and transform data into useful knowledge that helps achieve strategic and operational goals and facilitates high-quality decision-making. Business intelligence products' Visualisation Capability is one technique to present data in a variety of ways. Nowadays, analytics solutions are made possible by visualization capabilities, which allow many businesses to exchange and present quantitative and qualitative data in a way that is more user-friendly, and data-driven, and enables users of all levels to quickly identify the most crucial figure. Data visualization technologies enable organizations to present

daily business metrics and key performance indicators (KPIs) more interactively. These tools are increasingly being used in conjunction with data storytelling tales to offer more profound context and significance.

- **Technical Capabilities**

Business intelligence is the technology-driven process of data analysis and actionable information delivery that supports managers, employees, and executives in making wise business decisions. Organizations gather data from external and internal IT systems, prepare it for analysis, run queries against the data, and produce data visualizations, dashboards, and reports as part of the business intelligence process. Business users can then use the analytics results for strategic planning and operational decision-making.

- **Managerial Capabilities**

Business intelligence (BI) managers are responsible for planning, coordinating, and supervising the design, development, and implementation of organizational reporting and analytics. They also manage teams of business analysts and programmers.

  - Knowledge of data analysis
  - Expertise in BI tools
  - Experience in team leadership
  - An understanding of business processes
  - Strong communication and problem-solving skills
  - Skills in change management and organizational influence
  - Being a skilled negotiator
  - Being able to secure resources and buy-in for BI initiatives

- **Development Capabilities**

Business intelligence (BI) systems can help businesses adjust in real time and make strategic changes. The development of a BI system can be thought of as a project with a specific goal, expected development costs and times, and the coordination of resources.

## Literature Review

In this study, the data is collected from the organizations that are operating in India using judgmental sampling. PLS-SEM is used for hypothesis testing and assessment of measurement and structural models. The results indicated that business intelligence helps organizations to create value by improving performance at the business process level. The impact of this can be seen in improvements in organizational-level performance. Also, the BIS maturity facilitates an up gradation in information quality hence improving the use of information in managerial decision-making. The information gathered through a matured business intelligence system, in turn, improves the overall organizational performance. The research is useful for the organizations and also the managers and decision-makers to understand the role of various underlying factors contributing towards value creation through business intelligence. (Srivastava. A 2024)

The purpose of this study is to shed light on how the banking sector views the relationship between green innovation, responsible leadership, and GHRM practices about business sustainability practices. 396 banking professionals who work for the top five commercial sector banks in the country gave the data. Structural equation modeling was employed to assess the study's hypotheses through analysis utilizing the Mplus application. The results demonstrate a favorable correlation between green process innovation, ethical leadership, GHRM practices, and sustainable business performance. The function that pro-environmental behavior played as a partial mediator between responsible leadership and sustainable business performance, however, was a fascinating discovery (Iajz A 2023)

This study, which focuses on SMEs in Chile, examines how a sustainability trend driven by innovation in technology and performance measurement systems might support and sustain sustainable businesses in the face of the unstable, unpredictable, and complicated socio-political and economic environment of today. Globally, business performance management (BPM) of flourishing organizations is being driven by problems like sustainability, innovation, and social responsibility; these companies are often advocates for more social equity, corporate sustainability, and fairness (Elsevier B. V. 2023)

The purpose of this study is to look into how Business Intelligence Systems (BIS) affect top-level management's ability to make strategic decisions. The quality of strategic decision-making is the dependent variable in this study, whereas data quality, data visualization, and BI management are the independent variables. The study also investigates the moderator variable, BI Scope, to better understand how BIS and the caliber of strategic decision-making are related. This study adds to the body of knowledge already available on business intelligence and strategic decision-making by

offering insightful information about the connection between BIS and the caliber of strategic decision-making. The results demonstrate the positive and significant relationships between the quality of strategic decision-making and BI Management, BI Scope, Data Quality, and Data Visualization. The results demonstrate the positive and significant relationships between the quality of strategic decision-making and BI Management, BI Scope, Data Quality, and Data Visualization. Good BI management strategies highlight the importance of BI resource management by improving the quality of decision-making. Additionally, the study emphasizes the significance of BI Scope as a moderator variable and shows how it affects the relationship between BI and decision-making quality (Ibrahim. A, AlSondos. A 2023)

Businesses have been urged to include sustainable development in their operations. Businesses are held accountable for social issues and environmental deterioration as a result of their unsustainable operations. However, a Business Sustainability Performance Assessment (BSPA) is necessary to determine whether companies are incorporating sustainable methods into their operations. Consequently, a plethora of methodologies, instruments, and strategies have been developed to evaluate sustainability performance at the corporate level. As a result, the goal of this study is to identify the different business-level sustainability evaluation methodologies, instruments, and strategies(Shaulik. P 2023). This study's main goal was to ascertain how BI tools affected the competitive advantage, performance management, and decision-making quality in supply chain operations in engineering and pharmaceutical companies. This is a quantitative research study; however, a qualitative study based on in-depth interviews with BI users and managers utilizing judgmental sampling was conducted beforehand to gain useful insights into how BI is used and best practices for designing effective dashboards (Sharoff. N 2022)

Despite growing sensitivity to environmental issues across the globe, consumers of emerging economies lately started to adopt sustainable consumption. For the past decade, the paradigm shift of consumers toward sustainability led to an increase in the interest of researchers to examine ecologically conscious or green buying behavior. Against this backdrop, the main purpose of the study is to analyze the impact of sustainable consumption on competitive advantage. The study also aims to examine the effect of various personal and organizational determinants on behavioral intention, brand loyalty, sustainable consumption, and competitive advantage. Furthermore, the mediational role of behavioral intention and positive word-of-mouth were also examined. (Sheikh. B.I. 2022)

Tried to decipher that there are issues that are left unaddressed concerning business intelligence systems in the Indian banking sector where the impact of data analytics technology on banking performance is very high. The existing literature also paved the way to understand the application

of business intelligence systems in making banking operations successful and to identify those dimensions constituting business intelligence systems and their impact on banking and employee performance as a whole (2019Manjunath. S. J. 2019

Focused of the study was to determine the impact of business intelligence tools on the quality of decision-making and organizational growth in IT organizations in Pune. The study also focuses on determining the impact of BI tool-based quality decision-making on decision categories (operational, tactical, and strategic) and the development of leadership traits in managers. The study also focused on identifying the areas of usage of BI analytics and important BI analytics in IT organizations. The study also focused on identifying the relationship between the importance and usage of BI analytics (Khurana. V 2016)

## GAP

**Here are some GAP found in the review literature:**

- Supply chains are impacted by technical and visualization skills, while IT industries are not affected. Although decision-making is impacted by IT technologies, no one was focusing on this in an earlier study. A key component of a business intelligence system is its technical and visualization skills, which is something that the IT sectors must also improve.
- Development and Managerial, the banking industry is impacted by capabilities, while the IT industries are not. Two more key capabilities are not widely discussed in the IT industry but have an impact on it anyway.
- Furthermore, according to a prior literature review I did, business intelligence has not addressed sustainability. In today's competitive world, every industry is heading toward sustainability, but the IT industry is the only one that doesn't discuss it.
- A possible limitation in the study's configurable model among IT industries is that previous research on competitive advantages, but not sustainable competitive advantages, may have been ignored.
- Up until now, no one has discussed how information technology and decision-making can lead to sustainable corporate performance.

## Objectives of the Study

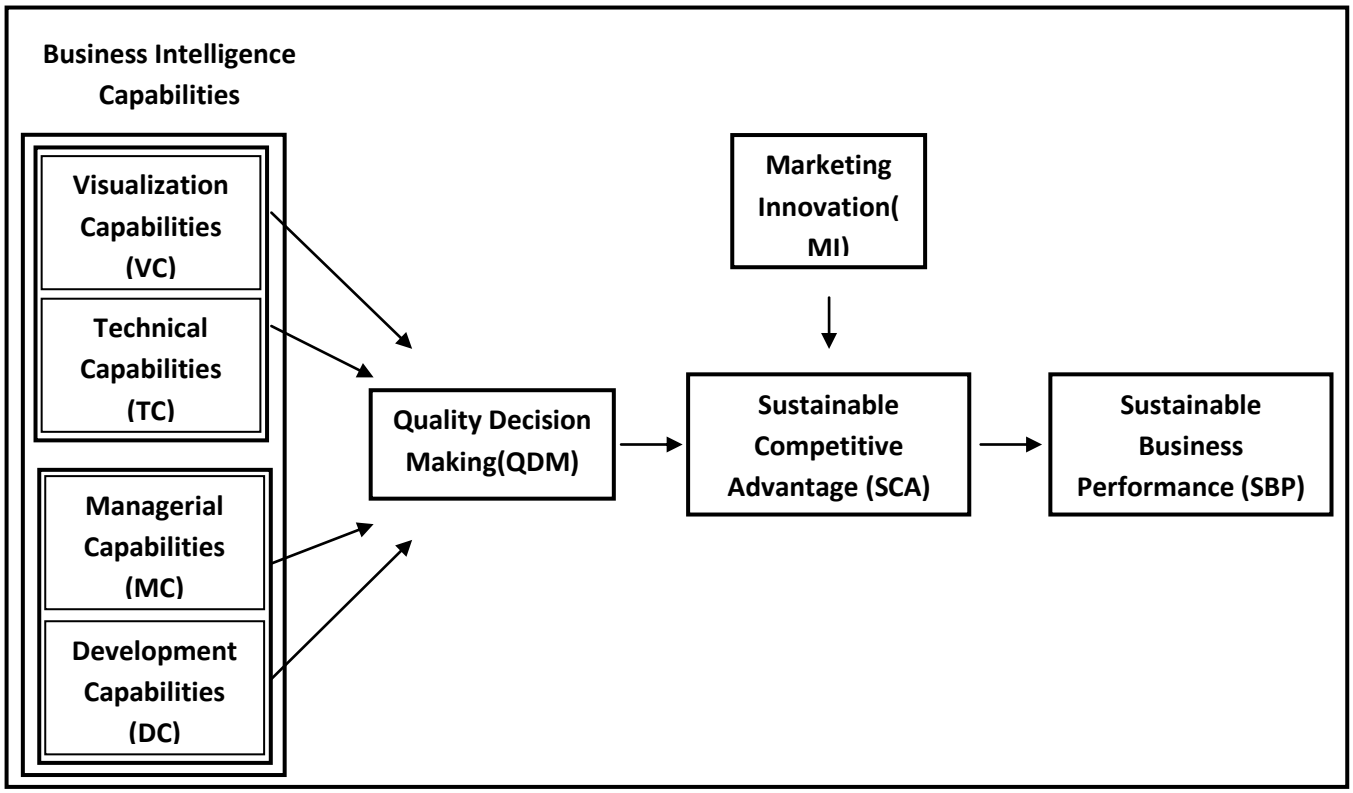
The principal aims of this research are to ascertain the constituents of the IT Industries' Business Intelligence System, assess the significance of the system's capabilities in enabling the IT industry to succeed, examine the correlation between the elements of the business intelligence system and Quality Decision Making, and assess the influence of QDM on Sustainable Competitive Advantage (SCA) and Sustainable Business Performance (SBP). Investigate and determine the connection between the Business Intelligence System and Sustainable Competitive Advantage in the IT Industries. Access the Impact of Business Intelligence System on Quality Decision Making in IT Industries. Analyze the impact of Sustainable Competitive Advantage on Sustainable Business Performance in IT industry employee performance. Along with it, to find the differences in various aspects of Business Intelligence Systems, Quality of decision-making, IT Industries, and Its Employee's performance across the selected Demographic Characteristics of Respondents and analyze the Association among the selected Business Intelligence Capabilities in IT Sectors. Finally, use structural equation modeling to determine the relationship between business intelligence capabilities and sustainable competitive advantage as well as sustainable competitive advantage and sustainable business performance of employees and industry.

1. To study various capabilities of Business Intelligence Systems in the IT Industry.
2. To identify the factors relating to Sustainable Competitive Advantage in the IT Industry.
3. To examine the impact of Business Intelligence Capabilities on Sustainable Business Performance at the Operational Level in the IT Industry.
4. To recommend a futuristic Framework for boosting Sustainable Business Performance in the IT Industry.

## Problem Statement

The researcher investigates the "Impact of Business Intelligence System Capabilities for Sustainable Business Performance in the Information Technology Industry" after evaluating the literature. A survey of the literature revealed that the foundation of the business intelligence system is the Information Technology industry, but no studies have been done on the relationship between the capabilities of the business intelligence system and sustainable business performance in the information technology sector.

## Conceptual Framework




The above conceptual model defines the Capabilities and their effect on Quality Decision Making the effect of Quality Decision Making and Managerial Innovation on Sustainable Competitive Advantage and the effect of Sustainable Competitive Advantage on Sustainable Business Performance.

**Quality Decision Making (QDM):**

Throughout the information-generating process, there is a significant reduction in the possibility of fraud and human error due to the automated nature of the business intelligence system. Decision-makers will be more trusting of the system as a result, and the workplace will become more productive and dependable. Poor data quality costs the IT industry $15 million a year,

according to a Gartner analysis. This expense is projected to increase in the future since inconsistent data collection practices lead to inaccurate datasets. This effect is closely tied to data because datasets and data are essential to the entire IT industry. With the BI system, this problem may be easily fixed because of Data Quality Management, a comprehensive system that cleans, separates, and manages data. Since higher-quality data leads to better analysis and more profitability, the BI system is built on quality rather than quantity. Improved data quality will lead to better identification of Key Performance Indicators (KPIs). Future results will require automated complex corporate processes, accurate forecasting, and deliberate decision-making. As AI and analysis produce the table utilizing business knowledge, data scientists with expertise in AI may create smart and intelligent models to help executives keep informed about KBEs, or important business events. AI can be used to produce dashboards for real-time process and operation analysis, as an alternative to relying only on historical data. Managers can gain a variety of insights into customer behavior and corporate processes with the help of complex analytics, which are generated automatically and quickly. In the IT sector, decisions are made quickly and with high quality these days. This means that they can make decisions five times faster, which can impact sales estimates. Budgeting, inventory control, guaranteeing customer satisfaction, and improving the customer experience.

## Sustainable Competitive Advantage (SCA)

Sustainable Competitive Advantage, according to its definition, is a combination of attributes and skills that make an enterprise more capable of satisfying the needs of its customers than its competitors. In other words, a company can outperform its competitors and maintain its leading position in the market. This gives a company greater focus, which helps it achieve higher and better profit margins. Numerous factors, including distribution networks, product design, technology, customer support, and branding, might contribute to this advantage. The sustainability problem arises from the fact that it takes a lot of work to duplicate or replicate it. It should also be able to withstand shifts in the market and the arrival of new rivals. A corporation that has effectively patented a novel technology may find itself in a favorable position because it is hard to replicate without infringing upon the rights of the parent company. Because competitors find it difficult to match awareness and loyalty, a business with a great brand reputation may also enjoy a long-term advantage. The ability of a business to sustain a competitive advantage determines its long-term success in the market.

## Marketing Innovation (MI)

Marketing innovation is the act of creating and executing new marketing strategies, such as major adjustments to product positioning, promotion, design, or price. Marketing innovation aims to innovate how goods and services are advertised and provided to customers, in contrast to traditional marketing, which frequently depends on tried-and-true methods. It frequently entails utilizing cutting-edge technology, implementing fresh communication tactics, attempting unorthodox marketing avenues, or investigating innovative pricing schemes.A marketing innovation is the application of a novel marketing strategy that involves major modifications to a product's packaging, design, placement, promotion, or cost. To boost the company's sales, marketing innovations try to better meet the demands of their target audience, expand into untapped markets, or reposition a product.

## Sustainable Business Performance

Sustainability in business, or Sustainable Business Performance, is the capacity of an organization to meet the needs of stakeholders and customers while balancing social responsibility and profitability. BSP integrates environmental preservation, financial success, and social responsibility into company operations. Considerations for stakeholders are also taken into account. A variety of problems that are only going to get worse in the modern world have given rise to the phrase "sustainable development" (SD). The earth is not becoming socially, ecologically, or economically sustainable due to several problems, such as increasing pollution levels, erratic weather patterns, rising greenhouse gas emissions, rising rates of poverty, expanding global populations, and a host of other negative reasons.

## Hypothesis

- **H1 A:**There is a positive and significant impact of Visualization Capabilities on Quality Decision Making
- **H1 B:** There is a positive and significant impact of Technical Capabilities on Quality Decision Making.
- **H1 C:** There is a positive and significant impact of Managerial Capabilities on Quality Decision Making.
- **H1 D:** There is a positive and significant impact of Development Capabilities on Quality Decision Making.
- **H2:** There is a positive and significant impact of Quality Decision Making on Sustainable Competitive Advantage.
- **H3:** There is a positive and significant impact of Marketing Innovation on Sustainable Competitive Advantage.
- **H4:** There is a positive and significant impact of Sustainable Competitive Advantage on Sustainable Business Performance.

## Research Methodology

Research is exploratory. This methodology searches for poorly explored research questions. To precisely determine the nature of the problem that has to be solved, this is an exploratory study. The word "exploratory research" refers to a research methodology that looks for undiscovered research problems. This initial investigation's goal is to accurately define the kind of issue that has to be resolved. Primarily exploratory, exploratory research frequently takes a qualitative form. On the other hand, an exploratory study with a big sample size could also be quantitative. Primary and qualitative research methods are frequently used in exploratory studies. Nonetheless, an exploratory study with a big sample size might also be quantitative. Because of its adaptability and open-endedness, it is also sometimes referred to as interpretive research or a grounded theory method. Research done to look into a problem that is not well defined, has not received enough attention, or is not well understood in general is known as exploratory research. The method, which is also known as interpretive or grounded theory research, aims to provide insights that can serve as the basis for more focused future research rather than producing definitive findings. You can refine the data you require and create research questions and hypotheses for further study using the insights gleaned from exploratory research. Because of this, to make the most out of exploratory research, you must have an open mind and be prepared to modify your plan of action and research strategy as necessary.

- **Sample Size and Sampling Technique**

A form of non-probability sampling approach called stratified purposive sampling will be used in the investigation. Though the latter may also surface in the analysis, the goal of the stratified purposive sample is to capture major variances rather than to find a common core. A reasonably homogenous sample could come from any one of the strata. In contrast to stratified random sampling, stratified intentional sampling is likely to use sample sizes that are too small for generalization. A research study that uses a stratified deliberate sampling strategy can look more credible. Using a stratified purposeful sampling strategy may make sense when there is sufficient information available to identify characteristics that could impact how the phenomena manifest themselves.

The number of observations or replicates (the repeating of an experimental condition used to determine the variability of a phenomena) that should be included in a statistical sample is known as the sample size, and it is a statistical concept. It is an important aspect of any empirical study requiring that inferences be made about a population based on a sample. Essentially, sample sizes are used to represent parts of a population chosen for any given survey or experiment. To carry out

this calculation, set the margin of error, ε, or the maximum distance desired for the sample estimate to deviate from the true value. To do this, use the confidence interval equation above, but set the term to the right of the ± sign equal to the margin of error, and solve for the resulting equation for sample size, n. The equation for calculating sample size is shown below.

**Finite population** $$n' = \frac{n}{\frac{z^2 \times x\hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Where

z is the z score
ε is the margin of error
N is the population size
p is the population proportion

| S. No. | Company Name | No. of Employee | 3/4 Employees working on Operational level |
|---|---|---|---|
| 1 | Dot SquaresPvt. Ltd | 1000 | 750 |
| 2 | A3Logics | 350 | 262.5 |
| 3 | Owebest | 1000 | 750 |
| 4 | Girnar Soft Pvt. Ltd | 2500 | 1875 |
| 5 | Pratham Software | 250 | 187.5 |
| 6 | Starbit IT Solution | 250 | 187.5 |
| 7 | MetaqubePvt. | 500 | 375 |
| 8 | Cyntexa | 500 | 375 |
| 9 | In time tac | 450 | 337.5 |
| 10 | Atcs | 500 | 375 |
| **Total No of Employees Working on Operation Level** | | | **5475** |

A sample size of this study is necessary to estimate the percentage of employees in the IT industry in Jaipur who identify as vegans with a 95% confidence level and a 5% margin of error. Ten IT companies were selected for the sample study and the number of employees working on the operation level with a limited population size of 5475. Z equals 1.96 at a 95% confidence level. Thus the computed sample size is 360.

- **Sampling Restrictions**

The Jaipur district shall be the source of the sample. Many software companies move from Noida and Gurugram to Jaipur and have the same work culture. In this research, 10 top businesses

operating in Jaipur are included in the IT industry's report. The Industries offers Software Solutions, Web Development, Mobile Applications, Software Integration, and other services related to Information Technology not only alt the national level but also international level.

- **Tools for Collection Data:**

The quantitative research methodology is followed by the questionnaire survey collected from employees working on the operation level, Using Business Intelligence Tools for decision-making in IT organizations.

- **Analysis and Interpretation of Data**

The study's data will be evaluated with the aid of structural equation modeling (SEM), a multivariate statistical analysis technique for looking at structural relationships. This approach combines multiple regression analysis and component analysis to investigate the structural relationship between observable variables and latent constructs.) it includes Exploratory Factor Analysis (EFA): While CFA is employed when a strong theory regarding the structure exists, EFA is used when it is unknown how many factors exist between the items and which factors are determined by which items. & Confirmatory Factor Analysis (CFA - CFA enables the investigator to examine the hypothesis that there is a connection between the variables that are observed and the latent construct(s) that underlie them.) In addition to the SAS analytical tool, used for finding some impact factors. The researcher favors this approach since it estimates several related dependencies in a single analysis. The two types of variables used in this analysis are endogenous and exogenous. The independent and dependent variables are the same as endogenous variables.

- **Anticipated Result**

The BI capabilities used in this study are not currently being used in any IT industry research. The researcher must therefore determine whether the software businesses profit from the presence of technical, managerial, development, and visualization capabilities following the inquiry.

## Expected Outcome

The research also found that Business Intelligence tool information has a positively significant influence on quality decision-making and has a significant influence on organizational performance. The research also found an improvement in organizational growth after the Business Intelligence tools implementation. In the current scenario, the research finding depicted how BI tools affected Quality Decision Making influenced the Sustainable Competitive Advantage. The research also finds how Sustainable Business Performance is affected by Sustainable Competitive Advantage to enable the development of dynamic, confident, and motivated leadership traits in operation-level employees and managers. The study provides details of best practices of Business Intelligence tools implementation in IT Industries along with solutions for the key implementation challenges. It offers recommendations to organizations on how to better use the tools available to them to make better decisions.

The study's findings will support IT Industries in developing and implementing a business case for BI technologies. According to the study, managers who use BI tools to make quality judgments are more likely to acquire dynamic, self-assured, and driven leadership attributes. Additionally, these tools help managers make high-quality tactical and strategic decisions. The study's conclusions showed that sales, utilization, and profitability analytics are widely used in IT companies and are crucial to the business for high-quality decision-making. The study offers specifics on the best ways to utilize BI tools. The report offers solutions for the main issues with implementation as well. The study's findings will assist BI tool-based organizations in enhancing how best to use the tool to enhance decision-making quality and foster organizational expansion. The study's findings will support non-BI tool-based organizations in developing a business case for implementing BI tools. Many suggestions for further research have been made by the study, including the impact of BI tools in analytics, software development, mobile app development, cloud computing, and online and real-time computing on managerial innovation and sustainable business performance. These recommendations have been made to the IT organization.

## Schedule of Work

| Research Activity | 6 | 12 | 18 | 24 | 30 | 36 | |
|---|---|---|---|---|---|---|---|
| 1. Course Work | | | | | | | |
| 2. Literature Survey | | | | | | | |
| 3. Methodology Steps | | | | | | | |
| 4. Quarterly Report | | | | | | | |
| 5. Communication of Papers | | | | | | | |
| 6. Preparation of Final Thesis | | | | | | | |
| 7. Submission Thesis | | | | | | | |

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